

# **Mabel Release 008**

## **Software Change and Release Note**

Version 1.0, 10/24/2012

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### **Introduction**

MABEL Release 008 is a major release that will create new versions of all L1A, L1B and L2A data. This release contains significant improvements, including:

- A drastically improved dynamic DEM.
- A reference track and EGM96 geoid.
- Dramatically improved geolocation.
- A tighter range window for L2A photons (which decreases the size of L2A granules).
- A photon noise estimate.
- A preliminary calculation of apparent reflectance.
- Completely redesigned metadata.
- NetCDF-4 compliance.
- Improved browse products.
- Improved oscillator error detection.

This release note focuses on changes to the MABEL software. For more information about the data products themselves, please refer to the appropriate MABEL Standard Data Product document.

Send comments and report any issues to David Hancock (David.W.Hancock@nasa.gov).

### **Repository**

The MABEL data, documentation and example code are available at the following URL:

[http://icesat.gsfc.nasa.gov/icesat2/data/mabel/mabel\\_docs.php](http://icesat.gsfc.nasa.gov/icesat2/data/mabel/mabel_docs.php)

**Please read the Standard Data Product Document for each product you will be using.**

### **MABEL Product Release Summary**

Release 008 of the MABEL products is created by Version 1.6 of the MABEL processing software. All products were re-created for this release. The following table summarizes the correspondence between versions of the software and releases of the MABEL products.

**Table 1: MABEL Product Release Summary**

| Release | Software Version | L1A              | L1B              | L2A              |
|---------|------------------|------------------|------------------|------------------|
| 000     | 1.0              | Initial          | No Release       | No Release       |
| 001     | 1.1              | No Change        | Initial          | No Release       |
| 002     | 1.2              | Updated          | Updated          | No Release       |
| 003     | 1.3              | No Release       | No Release       | Initial          |
| 004     | 1.3.1            | Updated          | Updated          | Updated          |
| 005     | 1.4              | Updated          | Updated          | Updated          |
| 006     | 1.4+             | Not Released     | Not Released     | Not Released     |
| 007     | 1.5              | Updated          | Updated          | Updated          |
| 008     | 1.6              | Updated (Latest) | Updated (Latest) | Updated (Latest) |

## Software Description

The MABEL HDF5 L1A software (mabel\_l1a) reads the Level-0 MABEL TOF files and stores the original data and derived parameters into a Level-1A HDF5 file.

The MABEL HDF5 L1B software (mabel\_l1b) reads Level-1A MABEL HDF5 and Novatel INS text files, and writes the range calibrated for instrument effects and INS parameters and into a Level-1B HDF5 file.

The MABEL HDF5 L2A software (mabel\_l2a) reads Level-1B MABEL HDF5 files, and writes the elevations, histograms, DEM, tropospheric-correction information into a Level-2A HDF5 file.

HDF products require version 1.8.9 of the HDF5 library.

Browse products require IDL version 8.1+.

All primary processing code is written in Fortran and tested with gfortran 4.7.0 and the 1.8.9 version of the HDF5 library. The development and production environments are little-endian x86\_64 platforms (MacOSX/Ubuntu Linux).

## Release Overview

Significant changes have been made to both the format and content of the MABEL data products.

## Product Format Changes

Version 1.6 of the MABEL software incorporates lessons-learned from the GLAS\_HDF development process. The development team has incorporated code written for the GLAS\_HDF effort into the MABEL codebase to 1) improve CF-compliance, 2) make the MABEL products NetCDF-compatible, and 3) completely overhaul metadata. Our product design continues to evolve and we welcome comments on the design of the HDF5 files.

A significant design change is the use of attributes (rather than datasets) for non-science data parameters. The HDFGroup recommended we use attributes rather than datasets because

attributes are significantly more efficient for containing small amounts of data. The primary information affected by this change is metadata and a new construct designated as “ancillary\_data”. The development team realizes this imposes the burden of changing existing software upon the user community, but since ancillary\_data is a new feature, and metadata was changed so drastically, it seemed to be a good time to make the switch.

MABEL metadata was completely redesigned to match GLAS\_HDF metadata implementation. CF-style global metadata has been enhanced to contain much more information. The structured metadata has adopted GLAS\_HDF’s pseudo-ECHO style of grouped collection and inventory-level metadata. There is a significant amount of information duplicated between the global and structured metadata. This is intentional since the different styles of metadata serve different purposes.

The global metadata is intended for CF-compliance and human-readability. MABEL product users are encouraged to use the CF-style global metadata (rather than the structured metadata) whenever possible within their code. Please report any useful information contained within the structured metadata that is currently not present in the global metadata for consideration in future updates.

The structured metadata is designed to instrument the products with information required to deliver products to an ECHO-based Data Center using ECS-compliant detached metadata files. That said, the structured metadata implementation is still in a transitional phase since we intent on switching to ICESat-2/SMAP-like ISO19115-compliant metadata in a future release.

“ancillary\_data” is a new construct that bridges the gap between metadata and product parameters. ancillary\_data is implemented by group-attached attributes that contain constants and variables using during processing that may prove useful for data users. Example of information contained within include the MABEL clock frequency, geolocation parameters, and various range window sizes. Of particular importance is the granule epoch time (gps\_sec\_offset) that is directly attached to the ancillary\_data group.

A new feature of the Release 008 MABEL products is NetCDF-4 compliance. Through the incorporation of CF metadata and dimension scales, the new products should be compatible with NetCDF-based tools. Our NetCDF-compliance testing is limited to verifying that the “ncdump” utility can read the MABEL products without crashing.

New IDL and Fortran sample product readers are available from the ICESat-2 MABEL website. These are the same readers previously released with updates to use attributes instead of datasets (where appropriate).

## Sample Code Fragments

For prior releases, the following code was used to read the gps\_sec\_offset as an HDF5 dataset:

(Fortran)

```
gps_sec_offset=0.0d0
call h5ltread_dataset_f(h5_fileid, "/metadata/gps_seconds_offset", &
  H5T_NATIVE_DOUBLE, d_8, dims, i_res)
gps_sec_offset=d_8(1)
```

(IDL)

```
gps_sec_offset=0.0d0
ds_id=H5D_OPEN(h5_fileid, "/metadata/gps_seconds_offset")
gps_sec_offset=H5D_READ(ds_id)
H5D_CLOSE, ds_id
```

The same code modified use Release\_008-style attributes looks like this:

```

(Fortran)

gps_sec_offset=0.0d0
call H5LTget_attribute_double_f(h5_fileid, "/ancillary_data", &
    "gps_sec_offset", d_8, i_res)
gps_sec_offset=d_8(1)

(IDL)

gps_sec_offset=0.0d0
g_id=H5G_OPEN(h5_fileid, "ancillary_data")
h5_att_id=H5A_OPEN_NAME(g_id, "gps_sec_offset")
gps_sec_offset=H5A_READ(h5_att_id)
H5A_CLOSE, h5_att_id
H5G_CLOSE, g_id

```

## Processing/Product Content Changes

Improvements have been made to several aspects of the MABEL products and processing software. These changes are classified as geophysical improvement, geolocation improvements, new parameters, and general changes/fixes.

### Geophysical Improvements

Release 008 of the MABEL L2A product includes a reference track, geoid values and an enhanced DEM.

The MABEL elevations are referenced to the WGS84 ellipsoid.

The L2A product now includes a reference track. The reference track is computed at a rate of every 200 shots and takes into account aircraft angles and elevation.

The L2A product now includes a geoid. The geoid values are the EGM96 values interpolated from the “standard” 1-minute EGM96 grid at each point of the reference track.

The previous GTOPO30-based DEM has been replaced with a dynamic DEM that integrates data from multiple sources. The enhanced DEM is a “best-available” merge of values from the 30-meter GIMP (Greenland/Iceland only), 7.5 arc-second GEMTED2010 (global), 30 arc-second GMTED2010 (Antarctica), and DTU10 MSS (global mean sea surface) datasets. Each DEM was pre-processed and compressed into individual tiled HDF5 files. The values within the HDF5 DEM files are as-is and have not been modified. This means that each DEM value is referenced as follows:

| Dataset                       | Vertical Reference       |
|-------------------------------|--------------------------|
| EGM96 (1-degree)              | WGS84                    |
| DTU10 MSS (1-minute)          | TOPEX/Poseidon Ellipsoid |
| GMTED2010 (7.5/30 arc second) | EGM96                    |
| GIMP (30 m)                   | WGS84                    |

The MABEL software decides which DEM source to use based on the best-available data source. Using each point of the reference track as the location, the software first checks if the location is within the GIMP DEM. If not, or an invalid value is returned from GIMP, the software retrieves the value from the GEMTED2010 DEM. If the GMTED2010 value is invalid or 0, the software retrieves the MSS value from the DTU10 MSS. Finally, if the MSS value is invalid, the software

will use the EGM96 value as the default. A flag is provided to report the source of the value returned as the MABEL DEM.

If the source is indicated as GEMTED2010, the DEM value will be re-referenced to the WGS84 ellipsoid by:

MABEL DEM = GEMTED2010 + EGM96

If the source is indicated as DTU10 MSS, the value will not be adjusted since there are only small differences in the WGS84 and TOPEX ellipsoids ( ~ 0.71 meter).

## Geolocation Improvements

The Release 008 MABEL geolocation values are significantly improved due to a calibration effort headed by Scott Luthcke. This effort used calibration maneuvers performed by the ER-2 to derive improved calibration coefficients. Calibrations for MABEL beam angles were determined from the ocean scan calibration conducted during the 2012 Spring Greenland Mission (20120417 ~120400). The calibrations derived from the Greenland flights have been applied to all other flights. There is potential for even more improvement when additional scans from other flights are processed.

For the Greenland flights, three channels were not able to be calibrated and have been excluded from the L2A data products. The same three channels are excluded from the 2012 Fall New England data products.

An attempt was made to map the knowledge gained from the Greenland calibrations back to previous flights. All channels are currently included in the L2A data for the previous flights, but are known errors with some channels (ie: processed with wrong beam angles).

Extensive work was done to improve MABEL geolocation. However, there are still undetermined range and location errors.

## New Parameters

Two new parameters were added to the L2A product : noise sample and a preliminary relative apparent reflectance.

The noise sample is computed as the number of photons within a noise window below the expected surface. This window is defined as a span from -300 to -5300 meters about the DEM.

Relative apparent reflectance is a preliminary parameter whose computation has not been finalized. It is provided on the L2A product to foster development of the algorithm. For periods where the MABEL instrument team did not provide energy information, a provided flag indicates that the computation was not performed.

## General Changes/Fixes

The range window for L2A photon elevations has been reduced, in part due to the improved DEM. This should decrease the size of L2A granules. The range window is dependent upon the DEM source flag (dem\_flag). If the dem\_flag indicates GIMP\_DEM or GMTED\_DEM, the range window is 1k above and 100m below the DEM value. If the dem\_flag indicates MSS\_DEM, then the range window is 100m above and 100m below the MSS\_DEM.

Improved validation of the MABEL oscillator rate computation has eliminated jumps in elevation reported by data users. Unfortunately, this may actually eliminate segments of data where the jumps were reported.

An issue where the wrong flight location was stored in the metadata has been fixed.

A new TAI-UTC file was ingested to account for the 2012 leap second.

The L1A browse software was improved to display histograms instead of raw photons.

The L2A browse software was revised to account for the switch to attribute-based metadata and ancillary\_data, display the DEM source flag, display the noise sample, and simplify the pseudo-surface-finding (thanks to the improved DEM).

Example product readers (in Fortran and IDL) have been modified to reflect the switch to attribute-based metadata and ancillary\_data.

## Software Change Notes

Release 007 data products were created with V1.5 of the MABEL processing software. This following change requests were implemented in version 1.5 of the MABEL software.

### **[MABEL-18] - Make l1a hdf files netcdf-friendly**

Added dimension scales, CF attributes to MABEL products.

### **[MABEL-33] - Implement dimension scales on the MABEL products**

Added dimension scales to MABEL products for NetCDF compatibility. This required some rework to the product structure, especially QA.

### **[MABEL-76] - Implement computation of relative apparent reflectance for MABEL L2A**

Implemented preliminary version of the Apparent Reflectance ATBD. Some periods do not have the flightparm energy values required for the calculation. This is indicated in the AR flag.

### **[MABEL-91] - Replace existing MABEL DEM with ICESat-2 DEM/DRM**

Significantly improved the MABEL DEM by adding best-available data from the appropriate GMTED2010 DEM, GIMP DEM, or DTU10 MSS. A full description of the implementation is available on the MABEL website.

### **[MABEL-114] - Add geoid to mabel\_l2a**

Added the EMG96 geoid (referenced to WGS84) to the L2A MABEL product.

### **[MABEL-125] - Redesign the flightparams update method.**

Revamped the flight\_parameters by creating a flight file and a scenario file. These files will be updated manually when a new flightparm spreadsheet is submitted by the instrument team.

### **[MABEL-126] - Merge the common\_library routine updated in GLAS\_HDF with MABEL codebase**

The MABEL codebase has been synced with GLAS\_HDF in order to bring improvements made during GLAS\_HDF development to MABEL.

### **[MABEL-131] - Write critical MABEL coefficients to an ANCILLARY\_DATA group**

Added an ANCILLARY\_DATA group to each of the MABEL product types. This groups contains attributes which contain processing constants and other information potentially useful to MABEL data users.

### **[MABEL-133] - Add filetype to Metadata**

Added the filetype to revamped MABEL metadata.

**[MABEL-136] - Change project\_scientist field in the Metadata**

Fixed the project\_scientist metadata field by total revamp of MABEL metadata.

**[MABEL-138] - The flight\_parameters flight\_number is off by 1 which causes the flight location and other label info to be incorrect**

Fixed a reported problem with the flight location by a total revamp of the flight\_parameters.

**[MABEL-139] - no channel 14 in early mabel data makes browse fail**

Revised flightparams to include representative channel. Modified L1A browse to read representative channels from flightparams.

**[MABEL-140] - Add reference track to the MABEL L2 products**

Added a reference track to the MABEL L2A data.

**[MABEL-141] - Add a Noise sample to the MABEL L2 products**

Added noise sample to L2A product. Also added plot of noise sample to L2A browse data.

**[MABEL-142] - Reduce the window of elevations output on MABEL L2 products**

Changed the photon range window to vary dependent on the dem\_flag. If the dem\_flag indicates GIMP\_DEM or GMTED\_DEM, the range window will be 1k above and 100m below the DEM value. If the dem\_flag indicates MSS\_DEM, then the range window will be 100m above and 100m below the MSS\_DEM. This is tested at the DEM sample rate. Both sets of parameters can be overridden via control flags.

**[MABEL-144] - Implement HDF5 shuffle filter on MABEL data**

Implemented the HDF5 shuffle filter for MABEL data products. Testing has shown that this filter reduced a representative file size from 12MB to 11MB with an actual DECREASE in processing time.

**[MABEL-145] - Retrieve new TAU-UTC file for MABEL/GLAS\_HDF**

Retrieved new TAI-UTC file from navy.mil. Ran time\_lib unit test to verify file was good.

**[MABEL-146] - Revamp MABEL metadata to incorporate lessons-learned during glas\_hdf**

Revised MABEL Metadata to match ECHO+ used in GLAS\_HDF. Created ESDT files to feed the process.

**[MABEL-147] - Improvements to MABEL infrastructure**

Updated MABEL testing infrastructure to support new flightparams flight and scenario files, new method of doing one-hour processing segments, and new control file support for DEMs.

**[MABEL-148] - Add code to verify channels in data correspond to channels in flightparams**

Added a check to make sure the channels detected in the data correspond to the channels indicated within flightparameters.

**[MABEL-149] - Web distribution changes - Level 1 not necessary and whole flight access for L2**

Updated the web generation code to remove the L1A and L1B granules. Added code to create zip files for flights and scenarios.

**[MABEL-150] - Jumps in elevation**

Added a secondary check for a bad oscillator value. This should fix jumps in elevation reported by the Science Team. (It may actually just delete the affected data if there are not enough valid oscillator correction points to process the data).

**[MABEL-151] - Fix errors found in initial 1.6 testing**

Fixed miscellaneous errors detected during pre-release testing of Release\_008 data.

**[MABEL-152] - Select representative channels for all flights**

Added representative channels to flightparams for all scenarios.

**[MABEL-153] - Improve L1A browse**

Improved L1A browse by using histogramming instead of plotting individual photons. Performance was significantly improved.

**[MABEL-154] - Update L2A browse generation code to reflect V1.6 file formats.**

Updated L2A code to read new product formats. Removed LRC 3-D plots and added a noise plot based on the representative channel.

**[MABEL-155] - MABEL Angles and elevations actually applied to channels need to be in HDF file**

Modified flights/scenario files & related code to support channel exclusions and channel overrides. Modified code so that control overrides are reflected in the flightparm data on the product. Fixed an error when ch\_elev and ch\_angle were switched during parsing. Created unit test code to verify functionality of flightparam routines. Updated Greenland scenario file to incorporate Scott's calibrations.

**[MABEL-156] - Scott Calibrations for Greenland configuration**

Updated MABEL bias parameters per Scott's direction.

**[MABEL-157] - Updated mabel\_scenarios with unscrambled values provided by DH**

Updated scenario file to unscramble MABEL channels.

**[MABEL-159] - Data dictionary is getting garbage in the attribute names**

Fixed a problem that causes garbage characters in attribute names when creating the data dictionary. Used the returned size of the attribute name to trim the string to the appropriate length.

**[MABEL-160] - Update sample Fortran reader for Release 008**

Updated example Fortran and IDL readers to support Release\_008 product formats.



**[MABEL-161] - Make gps\_sec\_offset/gps\_seconds\_offset consistent throughout all code**

**[MABEL-162] - Logic error prevents using GIMP DEM**

Fixed a logic error in compute\_dem that caused GIMP DEM values to be overwritten by DTU10 MSS values.

**[MABEL-163] - Split shottags at end of file are giving bad times to scan\_tof.**

Changed the logic of scan\_tof to find the last whole shottag before the end of the file. This prevents TOF files with split shottags at the end from being classified as bad due to bad times.

**[MABEL-164] - Update MABEL SAS/SDMS ICD for Version 1.6**

MABEL/SDMS ICD has been updated to reflect 1.6 interfaces.

**[MABEL-165] - Provide proper citations for GIMP, GMTED and DTU10 in the L2A products**

Added the proper citation and source information to the L2A file for GIMP, GMTED, DTU10 and EGM96.

**[MABEL-166] - MABEL bias angles**

Implemented Scott's corrections for MABEL biases. Removed 3 channels from Greenland/East Coast L2A per PSO.

**[MABEL-172] - L2A QA crashes when no photons are available.**

Fixed an issue where L2A QA crashed when no photons were available.

**[MABEL-173] - Updated flight/scenarios for 2012-09 missions**

Updated the flight/scenario files with information from the v15 Day-by-Day spreadsheet. This reflects the addition of the East Coast (WFF) flights.

**[MABEL-174] - Update the flight/scenario files for Scott runs with his calcs 03-27-2012 and 10-19-2012 campaign.**

Updated scenario file provided.

**[MABEL-175] - Updated PGE/Lib versions for release 1.6**

Updated internal version strings to 1.6 October 2012 for PGEs and Libs.

## **Software Change History**

The change history is a summary of changes implemented in prior versions of the MABEL software.

### **MABEL v1.5 xx/xx/xx**

[MABEL-75] - Compute the true surface range for 10khz MABEL data

[MABEL-87] - Test MABEL geolocation code

[MABEL-92] - Make sure constants are initialized/overridden like matlas

[MABEL-94] - Add an "all channels" 3d plot to standard browse

[MABEL-95] - Add channel angle and elevation corrections to geolocation

[MABEL-96] - Fix error found in step 1 of the MABEL geolocation ATBD

[MABEL-97] - Ingest/Adopt MABEL Flight Parameters Spreadsheet V7.

[MABEL-98] - Add the ability to override embedded flight parameters with values from a new file.

[MABEL-100] - Refactor MABEL codebase to support SIMPL and GLAS\_HDF

[MABEL-102] - Error in flight parameters data on product

[MABEL-103] - MABEL Housekeeping data format change Jan-2012

[MABEL-104] - Modify SDMS to process Mabel data.

[MABEL-105] - Create miniSIPS to perform QuickLook processing of MABEL data

[MABEL-106] - Create QuickLook L1A Browse Products

[MABEL-107] - Handle nadir connector (99)

[MABEL-108] - Create utility to extract QA information from L1A.

[MABEL-109] - Ingest 02/22/2012 flightparameters file.

[MABEL-110] - Bad oscillator value

[MABEL-111] - Integrate L1A Quicklook into Web-based Browse

[MABEL-112] - Improve performance of MABEL IDL browse generators

[MABEL-113] - Create utility to create surface-to-dem comparison files to help with geolocation.

[MABEL-115] - mabel\_l1b is not respecting the output granule time in regards to INS data

[MABEL-117] - Implement the 2012-03-08 version of the Geolocation ATBD

[MABEL-118] - Flightparams needs better time resolution

[MABEL-119] - INS files are consistently inconsistent

[MABEL-121] - Add set\_plot, Z to idl program to avoid Xwindows problems.

[MABEL-122] - Error in time of day assign to MABEL Tx time

[MABEL-123] - Create 1 minute granules instead of the current 30 seconds granules

[MABEL-124] - Streak removal algorithm

[MABEL-128] - Allow for individual channel angle/elevation overrides

[MABEL-130] - Create option for deleting channels at the L1A level

[MABEL-132] - Clean up the MABEL HDF5 readers.

[MABEL-134] - Updated IDL code to handle deleted channels

[MABEL-135] - Final updates for MABEL Release 1.5 code

## **MABEL v1.4 11/xx/2011**

[MABEL-68] - Met range corrections wrong sign.

[MABEL-70] - Change Range Conversion Parameter

[MABEL-71] - 532 path length has the wrong units

[MABEL-82] - Update parameter descriptions based on feedback.

[MABEL-88] - Increase precision of INS data

[MABEL-69] - Added selected INS data to the MABEL L2A product

[MABEL-73] - MABEL flight Parameters update to v6

[MABEL-74] - Update the Geolocation module to include beam pitch angles and IMU offset true values

[MABEL-77] - Change self-documenting format from text to html.

[MABEL-78] - Add descriptive attributes for L1A and L1B parameters

[MABEL-79] - Write a code generator for HDF5 parameters.

[MABEL-86] - Implement the photon\_id in L2A

[MABEL-47] - Add housekeeping data to L1A HDF5 files

[MABEL-72] - Compute and apply oscillator correction to L1B range.

[MABEL-83] - Remove osc\_corr from L1A QA Data

[MABEL-89] - Create Release005 Mabel Products

## **MABEL v1.3.1 10/19/2011**

[MABEL-66] - Fix MET Trop fields in L2A

[MABEL-59] - L1A - Add descriptive attributes to quality\_assessment, metadata, and flight\_parameters

[MABEL-60] - L1B - Add descriptive attributes to quality\_assessment, metadata, and flight\_parameters to L1B

[MABEL-63] - Move common metadata fields to global\_meta\_mod

[MABEL-64] - Add start/end lat/lon fields to metadata

[MABEL-65] - Remove range patch from L2A

[MABEL-67] - Create Release\_004 Data Products

## **MABEL v1.3 08/25/2011**

[MABEL-9] - Develop the MABEL L2A processing Requirements

[MABEL-11] - Develop MABEL geo location ATBD

[MABEL-12] - Develop the Mabel Range ATBD

[MABEL-58] - Use actual speed of light for range computation

[MABEL-30] - Add descriptive attributes to quality\_assessment, metadata, and flight\_parameters

[MABEL-50] - Implement L2A Processing

[MABEL-8] - Define Mabel L2A processing

[MABEL-51] - Integrate geolocation code into mabel\_l2a

[MABEL-52] - Integrate trop code into mabel\_l2a

[MABEL-53] - Define final format for L2A H5 file

[MABEL-54] - Define QA data for L2A

[MABEL-55] - Integrate DEM code into mabel\_l2a

[MABEL-61] - Create L2A Data Description and Release Notes

## **MABEL v1.2 08/03/2011**

- [MABEL-32] - Fix the hertz attributes in the L1A data products
- [MABEL-38] - mabel\_l1a creating huge files
- [MABEL-42] - Control files not complete
- [MABEL-43] - Wrong flight information
- [MABEL-44] - gps\_sow\_offset is bad value in L1B
- [MABEL-45] - gps\_rate is inconsistently cast
- [MABEL-48] - Implement the new Novatel INS format for L1B
- [MABEL-41] - Add requested\_start, request\_stop times to L1A & L1B granules
- [MABEL-46] - write example hdf5 reader
- [MABEL-31] - Research time problems found in L0 TOF data
- [MABEL-49] - Create Version 002 L1A and L1B files

## **MABEL v1.1 07/11/2011**

Initial Version of L1B processor and first release of MABEL L1B data.

## **MABEL v1.0 06/24/2011**

Initial Version of L1A processor and first release of MABEL L1A data.